

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 March 2003 (06.03.2003)

PCT

(10) International Publication Number
WO 03/018420 A1

(51) International Patent Classification⁷: **B65D 43/10**, 45/32, 55/08

(21) International Application Number: **PCT/DK02/00569**

(22) International Filing Date: 30 August 2002 (30.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/316,035 31 August 2001 (31.08.2001) US

(71) Applicant (*for all designated States except US*): **GLUD & MARSTRAND A/S [DK/DK]**; Hedenstedvej 14, DK-8723 Løsning (DK).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **STEVELS, Josina, Talitha [NL/NL]**; Olieslagerslaan 20, NL-2012 EX Haarlem (NL). **DAVIES, Tim [NL/NL]**; Essenstraat 1, NL-2011 DW Haarlem (NL). **MADSEN, Christian, Ørum [DK/DK]**; Gudhjemsvæj 5, DK-6000 Kolding (DK). **HIMMELSTRUP, Niels [DK/DK]**; Vangelystvej 54, DK-5250 Odense SV (DK). **JANSEN, Maurice [NL/DK]**; Frederiksbergvej 44, 1.v., DK-8723 Løsning (DK).

(74) Agent: **PLOUGMANN & VINGTOFT A/S**; Sundkrosgade 9, P.O. Box 831, DK-2100 Copenhagen Ø (DK).

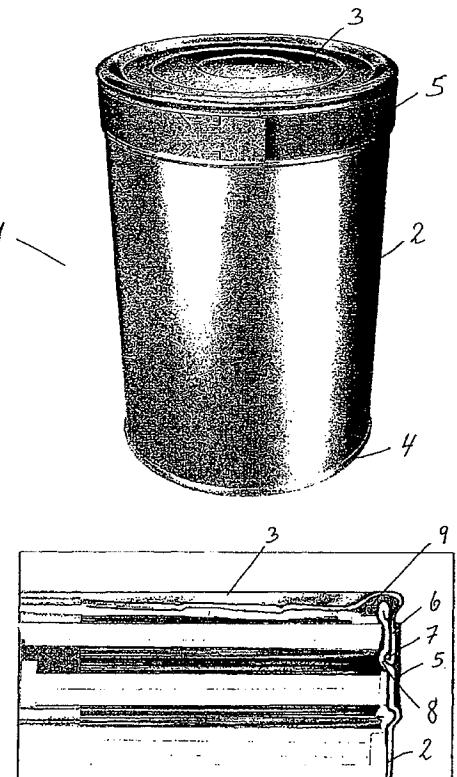
(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE,

[Continued on next page]

(54) Title: A RECLOSEABLE AND RETORTABLE CAN



WO 03/018420 A1



(57) Abstract: The present invention provides a can (1), wherein the lid (3) is easy to take off and put on for the consumer and is easily recloseable and reopenable after having been opened the first time. Further more the can in closed condition resists retorting (sterilisation by autoclave). The can requires little or no special equipment for a canning company as conventional canning machines may be used. The can comprises a detachable strip (5) extending circumferentially so as to secure a skirt (6) of a closure in a locking position.



GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

A RECLOSEABLE AND RETORTABLE CAN

The invention relates to a closure system for closing an opening encircled by a contact surface. In particular the invention relates to a recloseable can that is retortable and easy
5 to open and reclose. Furthermore the invention relates to a method of packing goods in a can comprising the above mentioned closure system.

Goods packed in metal packaging can only be opened once and not re-closed. Thus, the shelf life of the goods after opening is not very long.

10

Furthermore, the lid of canned goods is often quite difficult to remove from the can, as it requires a significant strength to tear it apart from the can, or the consumer needs a tin opener for that purpose. When the lid has been removed, the edge around the opening is often very sharp, and the consumer can easily cut his/her finger thereon.

15

Different cans are known from US 3,344,945, US 3,637,105, US 3,608,772, US 3,396,899, EP 0 373 013, US 4,318,494, US 3,701,454, US 4,520,942, DE 44 21 523, CH 359 611 and GB 205 045.

20 US 3,344,945 describes a resealable can comprising a can body having an open upper end portion, a can end closing said upper end, and a sealing tape provided circumferentially around the can.

US 3,608,772 discloses a reclosable container having a removable top closure
25 mechanically joined to the container body, the mechanical joint being cylindrical and connected and disconnected to each other. The container further comprising a rupturable band adhered over the joint. The lid/top of the container having a downwardly depending flange a part of which is reduced in diameter so as to internally fit the can body mouth.

30 Description of the invention

It is an object of the present invention to provide a can, wherein the lid is easy to take off and put on for the consumer.

It is an object of the present invention to provide a can that in closed condition can resist retorting (sterilisation by autoclave). It is a further object of the invention to provide a can that is easily recloseable and reopenable after having been opened the first time.

- 5 It is a further object of the invention to provide a recloseable can comprising few materials and with a simple and cost efficient geometry. It is an object to provide a can which requires little or no special equipment for a canning company - thus conventional canning machines should be able to be used.
- 10 According to a first aspect, the present invention relates to a closure system for closing an opening encircled by a contact surface, the contact surface comprising a first locking means, said system comprising:
 - a lid terminating in a skirt adapted to extend along an outer surface of said contact surface, the skirt comprising a second locking means adapted to co-operate with the first locking means, so as to secure the lid to the opening, and
 - a detachable strip extending circumferentially along the contact surface and overlapping at least a part of the skirt and the contact surface so as to secure the skirt in a locking position in relation to said contact surface.
- 15 20 The opening may be comprised in a can or a door or a box or a ship or any other surface. The first locking means may comprise a curled edge portion. The curled edge may extend inwardly in relation to a skirt of the lid. The curled edge may extend outwardly in relation to the skirt. The first locking means may comprise at least one corrugation each of which 25 may extend inwardly or outwardly in relation to the skirt. The first locking means may comprise one corrugation or two corrugations or three corrugations or four corrugations or five corrugations.
- 25 30 The second locking means may comprise at least one protrusion, such as one or two or three or four or five. The protrusion may comprise a corrugation.

In this application any protrusion may comprise a corrugation and in any of the examples where corrugation is mentioned the corrugation may be substituted by a protrusion. The difference being provided by the difference between a protrusion and a corrugation. In

fact any mentioned protrusion may be provided by a small tip like element extending from the surface to a circumferential track.

The curled edge portion may be adapted to co-operate with the at least one corrugation of
5 the contact surface. E.g. the curled edge portion may be adapted to engage a corrugation on the contact surface. The contact surface may comprise a sidewall of a can.

In one embodiment the closure system may be a resealable can comprising, a container comprising a bottom, a sidewall, and an opening, said sidewall comprising at least one
10 corrugation, a lid for closing said opening, the lid terminating in a skirt adapted to extend along an outer surface of said sidewall, the skirt comprising means for engaging said at least one corrugation, so as to secure the lid to the container, and a detachable strip extending circumferentially around the container and overlapping at least a part of the skirt and the sidewall. The opening may be arranged oppositely to the bottom.

15

The can may be a so-called three-piece can (container) with a bottom, a lid and a sidewall, and wherein the lid may be attached to the sidewall before filling the can with goods. Alternatively, it may be a two-piece can, wherein the bottom and sidewall is one piece formed by deep drawing. In the latter case, the can is filled through the opening,
20 and the lid is subsequently attached to the sidewall.

If the can is a three-piece can the lid and the detachable strip may be assembled to the can prior to assembly of the bottom. Thus a conventional canning machine may be used to fill the can with a content as only the bottom must be attached to the can after filling the
25 can.

The container may be for goods/canned goods, such as powder products (flour, meal, coffee, sugar, tea, etc.), such as fluids (beer, paint, etc.), food such as meat (fish, beef, pork, etc.), such as ready-meals, such as vegetables, such as fruit, such as biscuits etc.
30 The height of the sidewall from the bottom to the opening may be 1 cm or 2 cm or 5 cm or 10 cm or more, such as 20 cm or 50 cm.

The sidewall may be a tubular member that is substantially circular, but it can have any cross-sectional shape, such as oval or quadrangular. The sidewall may be conical or
35 curved or any other shape.

The means for engaging may be provided by a curled edge of the skirt defining an inwardly extending projection, which fits into the at least one corrugation. Thus, the lid can be attached to the container by sliding the skirt down over the container until the curled 5 edge engages said corrugation in the sidewall. The engagement between the curled edge and the corrugation provides an improved securing of the lid

The means for engaging may also be provided as a corrugation on the skirt portion adapted to engage a corresponding corrugation on the can. The means for engaging may 10 comprise a plurality of corrugations which are adapted to engage corresponding corrugations on the can.

Preferably, the at least one corrugation extends circumferentially along the container in an upper part of the sidewall near the opening. The corrugation may extend along the entire 15 periphery of the sidewall, or a plurality of individual corrugations may be provided and wherein the skirt then may comprise projections only at the locations where each corrugation is provided. In the latter embodiment the lid may be changed between a un-locked position and an locked position.

20 The lid may extend along the outer surface of the can and thus only a limited part of the lid may be in contact with the content of the can. This makes it possible to place the lid on an unclean table surface and re-attach the lid without putting a surface of the lid which has been in contact with the unclean surface in contact with the content of the can as the now unclean surface of the lid is situated on the outer surface of the can.

25 The inwardly extending projection and the at least one corrugation together provide a "click-on" attachment of the lid to the container. This "click-on" attachment of the lid provides an easy way of taking off and putting on the lid, as it requires very little physical strength to loosen the projection from the corrugation. Thus, a recloseable can is 30 provided.

A compound may be provided inside the at least one corrugation for providing a substantially tight closure between the engaging means and the at least one corrugation. The compound may e.g. be a rubber band or a band of silicone sprayed on or an 35 elastomer or synthetic rubber composite.

In another embodiment, the lid may be screwed or twisted on the container. In that case the skirt may comprise a plurality of projections and the sidewall may comprise a plurality of outwardly extending corrugations, the projections and corrugations engaging each other when the lid is screwed, such that a screw thread attachment is provided between the lid and the sidewall. The projections may extend around the entire circumference or only along a part of the circumference. The container may comprise one projection or two or three or four or five or six or seven or eight or nine or ten projections. In one embodiment the projections may be arranged such that the lid may be placed on the can and upon a twist the projections engage. The angle which the lid must be twisted so that the projections engage may be 5 degrees or 10 degrees or 15 degrees or 20 degrees or 30 degrees of 50 degrees or 60 degrees.

The lid may on at least a part of an internal corner surface between an upper part of the lid and the skirt comprise a compound engageable with an upper round-going curled edge of the sidewall for providing a substantially sealed closure between the lid and the container, when the means for engaging engages said at least one corrugation. The compound is preferably a rubber or silicone compound or an elastomer or synthetic rubber composite. In some embodiments the compound may be a glue e.g. a glue which may comprise a sticky surface even after being removed the first time. Such a glue may make it possible to reattach the lid to the can and still provide a tight closure. The glue may also be a glue which does not have a sticky surface after removal of the lid for the first time. Such a glue may after the first removal still be flexible so as to provide a substantially tight closure when other means keeps the lid in place in relation to the can. After the first removal the glue may have the same properties as a normal compound used to create an airtight closure.

When the compound is situated in the internal corner it may be protected from mechanical or chemical damage in a better way than when the compound is situated on an outer surface of the lid of the can.

As the can may comprise a curled edge of the skirt and an upper round-going curled edge of the sidewall, the can does not have any sharp edges on which the consumer can cut his/her fingers. Thus, a much more handle safe can is provided e.g. the can may be used to drink out of. If the lid extends along the outer surface of the can the curled edge portion

of the lid is not in contact with the content of the can. This is advantageous as such curled portions tend to corrode. This problem is usually solved by providing a protecting layer to the curled edge portion, which when the curled edge portion extends along the outer surface of the can is not necessary.

5

The strip is provided for securing the lid to the container after the lid is positioned on the container and until the consumer of the goods opens the can. Preferably, the strip may comprise a tape taped or heat sealed or welded to the skirt and sidewall, so that it is easy to remove by pulling, but still so tight fastened to the container that it maintains the curled 10 edge of the skirt in the corrugation, so that the lid does not come off during a sterilisation process. The strip may be a tubular member which is shrunk e.g. by use of heat over the lid.

The strip may comprise a grip portion, so that the consumer can tear off the strip by 15 pulling in the grip portion. The strip may be made of a polymer or a metallic material such as an aluminium foil or aluminium substrate or stainless steel or steel. The strip may also be made of a biodegradable material such as paper or card board or other materials. The strip may comprise a combination of the aforementioned materials.

20 The strip may comprise information about the content of the can. Thus the strip may be coloured the same colour as paint contained in the can. The strip may also comprise information about the use-by date of the content. The strip may comprise holograms or figures or signs such as signs for blind persons. The strip may extend along both the lid and the sidewall of the can and thus provide further information about the can. In some 25 embodiments the sidewall of the can may comprise a first print such as a picture or a painting which is covered by the strip. Thus when the can is empty the strip containing information about the content may be removed and the can may be used for decorative purposes. The strip may comprise a perforation such that a part of the strip may be removed (such that the lid may be removed) and the remaining part of the strip may 30 comprise information about the content of the can.

In an embodiment the can may further comprise protecting means adapted to protect at least a part of the strip. The protecting means may be comprised in or on the side wall and/or the lid e.g. the skirt of the lid. The protecting means may be adapted to protect the 35 strip from mechanical impact such that it may not be destroyed or a hole or a scratch may

not be made in the strip. The protecting means may protect from chemical impact such that a fluid e.g. a liquid or a gas may not deteriorate the strip. The protecting means may be movable. E.g. the protecting means may be a movable rubber band. A part of such a rubber band may be attached to the can or the lid.

5

The protecting means may comprise at least one corrugation on the lid. Alternatively the corrugation may be a band attached to the lid. The protecting means may comprise at least one corrugation on the can. Alternatively the corrugation may be a band attached to the can.

10

The strip and the "click-on" attachment, where the curled edge engages into the corrugation, together with the compounds provide a closure of the container that can resist the heat and pressure, that it is exposed to during e.g. an autoclave sterilisation process (retorting), without leaking. Thus, the can is retortable and therefore applicable to 15 all methods for preserving canned-food.

The strip may be reattached to the can after the consumer has opened the can. Thus, a substantially sealed closure is provided, e.g. while the can stands in the refrigerator.

20 The bottom may be a separate attachable part, which may be seamed to the container in known manner for closing a bottom opening.

The goods often need to be sterilised after being filled into the can. The temperature in the can during sterilisation may be e.g. 70°C, but when the consumer is going to open the 25 can, the temperature inside the can may be 20°C. This temperature difference provides a vacuum inside the can. As the can may be difficult to open due to the vacuum, the can may further comprise means for releasing a vacuum from the container closed by the lid and bottom part. Preferably, the sidewall or lid comprises one or more holes, and wherein the means for releasing vacuum comprises detachable sealings covering said holes. The 30 detachable sealings may comprise taps positioned in said holes, or peelable sealings covering said holes. The detachable sealings may be attached to the strip, such that when detaching the strip the sealings are simultaneously drawn out of the holes and the vacuum is released.

The lid may comprise one or more holes, which may be covered by an end portion of the strip or by another strip or by said detachable sealings. By removing the strip or detachable sealings from the hole, the vacuum is released from the can.

- 5 For strengthening the container, the sidewall may further comprise one or more strengthening corrugations extending circumferentially and/or from a bottom part towards the opening.

Preferably, the diameter of the opening is between 90% and 100% of the diameter of the container, such that it is easy to pour out/take out the content from the can. More preferably, the diameter of the opening is 91% or 92% or 93% or 94% or 95% or 96% or 97% or 98% or 99% of the diameter of the container.

Instead of extending on an outer surface of the sidewall, the skirt may extend on an inner surface of the sidewall.

Preferably, the container, the lid and the bottom part is made of metal, such as aluminium or tin plate or tin free steel or stainless steel or surgical steel. The container, the lid and the bottom part may be made of a plastic material such as a polymer or may be made of a biodegradable e.g. comprising a material based on whey or starch.

The invention according to the first aspect provides a can that is easy to open and reclose by use of very little physical strength. The way of opening and closing is "self-explanatory" for the consumer and does not require any instructions for use. Furthermore, the opening of the can does not result in splashes of the content, which is often seen with known cans.

Preferably, the container does not have any inwardly extending edges around the opening, and the diameter of the opening may be equal to the diameter of the tubular member or substantially equal to the diameter of the tubular member (if an upper part of the tubular member has a reduced diameter). Thus, it is easy to pour out/take out the content from the can.

According to a second aspect, the invention provides a method of packing goods, the method comprising the steps of:

- providing a can comprising:
 - a tubular member with a sidewall, and first and second openings arranged oppositely, said sidewall comprising at least one corrugation,
 - a lid and a bottom part for closing said first and second opening, respectively, the lid terminating in a skirt adapted to extend along an outer surface of said sidewall, the skirt comprising means for engaging said at least one corrugation, and
 - a detachable strip extending circumferentially around the tubular member and overlapping at least a part of the skirt and the sidewall,
- attaching the lid to the tubular member by positioning it over the first opening and sliding the skirt along the outer surface of the sidewall until the means for engaging engages the at least one corrugation, and
- attaching the strip around the tubular member, so that the strip overlaps at least a part of the skirt and the sidewall,
- filling the tubular member with goods through the second opening, and
- closing the second opening by attaching the bottom part to the tubular member.

20 The step of attaching the bottom part may comprise seaming the bottom part to the tubular member.

The second aspect of the invention may comprise any element or feature of the first and the third aspect of the invention.

25 According to a third aspect, the invention provides a method of packing goods, the method comprising the steps of:

- providing a can comprising:

30

- a container with a bottom, a sidewall, and an opening arranged oppositely to the bottom, said sidewall comprising at least one corrugation,

- a lid for closing said opening, the lid terminating in a skirt adapted to extend along an outer surface of said sidewall, the skirt comprising means for engaging said at least one corrugation, and
- a detachable strip extending circumferentially around the container and overlapping at least a part of the skirt and the sidewall,

5

- filling the container with goods through the opening, and
- attaching the lid to the container by positioning it over the opening and sliding the skirt along the outer surface of the sidewall until the means for engaging engages the at

10

- least one corrugation, and
- attaching the strip around the container, so that the strip overlaps at least a part of the skirt and the sidewall.

The third aspect of the invention may comprise any feature or element of the second and
15 the first aspect of the invention.

Preferred embodiments of the invention will be described in details below with reference to the accompanying figures 1-9.

20 Detailed description of the figures

Fig. 1 shows a can 1 according to invention and comprising a container with a sidewall (tubular member) 2, a lid 3, and a bottom part 4. As shown in the cross-sectional view, the lid 3 comprises a skirt 6 having a curled edge 7 defining a projection for engaging into the 25 corrugation 8 in the sidewall. Thus, the lid is attached to the tubular member by this "click-on" attachment between the curled edge 7 and corrugation 8. The lid is further secured to the sidewall by means of a strip 5 that is taped or heat sealed to a part of the skirt and the sidewall. A compound 9 is placed in the corner passage towards the skirt, and which provides a tight connection between the lid and a round-going upper curled edge of the 30 sidewall. In other embodiments the compound may be provided in other places of the lid e.g. on a part of the skirt.

Fig. 2 shows the same embodiment as shown in fig. 1 except for the further corrugations 10 provided in the sidewall for strengthening it.

Fig. 3 shows a can, wherein a hole 11 for releasing a vacuum is provided in the lid 3. The strip 5 extends circumferentially around the container and terminates in an end portion that covers said hole 11. Thus, the vacuum is released when tearing off the strip 5.

5 Fig. 4 shows an embodiment of the can, wherein the lid 3 is screwed on to the container. The skirt 6 comprises corrugations 12 engaging with corrugations (not shown) on the sidewall, so as to provide a threaded engagement between the lid and the sidewall.

Fig. 5 shows an embodiment of the can, wherein the lid 3 is attached to the container by
10 the "click-on" attachment between the curled edge 7 and the corrugation 8 comprising a compound 13 for providing a tight connection therebetween. The skirt 6 comprises a bulb 14, which will engage with the bulb 15 provided in the sidewall. Thus, the skirt will bend outwards when the two bulbs engage each other, which results in a release of the vacuum, as the curled edge 7 is lifted from the compound 13.

15

Fig. 6 shows how the strip 5 is torn off the can. The strip is pulled in the direction of the arrow.

Fig. 7 shows a strip 5 having a grip portion 15. The portion 15 is bent inwardly in the
20 direction of the arrow, when the strip has been taped to the can. When the consumer opens the can, he/she bent the portion 15 in an outward direction and tears the strip off as shown in fig. 6.

Fig. 8 shows the attachment between the skirt 6 of the lid 3 and the sidewall 2. The bead
25 16 of the lid both protects the sides of the can and acts as a grip-surface for the consumer, when taking off the lid. This attachment provides an improved closure, as:
– an overpressure in the container will provide a larger force acting inwardly on the skirt, which results in a strengthened closure, and
– a vacuum inside the container will draw the lid downward and provide a larger force
30 acting on the compound 9, which results in a strengthened closure.

Fig. 9 shows an easy stackability of the two cans 1, 1' due to the design of the corner of the lid and the bottom part. The bottom part 4 is seamed to the sidewall, and the internal diameter of the bottom part is adjusted to the upper outer diameter of the lid, so that the
35 cans can be stacked on each other in a safe and smart manner.

Figs. 10-18 show different pressure equalising elements of the can. The elements are used to transform a vacuum or a high pressure to the pressure of the surroundings of the can e.g. 1 bar pressure.

5

Fig. 10 shows a plug 30 comprised in the lid 32. In the initial state the plug 30 is placed such that no air may enter or leave the can. In this state locking-area 34 of the plug 30 engage the sides 33 of a hole in the can. The pressure is equalised by pushing the plug 30 in the direction indicated by the arrow 35 resulting in an air passage between the sides 10 33 of the hole and the unlocking-area 36 of the plug 30. Afterwards the hole may be locked again by pushing the plug 30 further down such that re-locking-area 38 engage the sides 33 of the hole.

Fig. 11 shows a foil 40 attached to the top of the can 42. On top of the foil is located a lid 15 44. When the can is to be opened the lid 44 is removed and the foil may be removed such that the content of the can may be accessed. The can may be relocked by putting back the lid 44 on the can 42. The foil may comprise a slip (not shown).

Fig. 12 shows a can 50 with a lid 52. The lid 52 comprises a skirt portion 54 with an 20 uneven edge 56. As the can 50 has a corresponding uneven corrugation 58 the pressure may be equalised by turning the lid 52 in the directions of the arrow 60 resulting in a air passage between the lid 52 and the can 50.

Fig. 13 shows a can 70 with a lid 72 comprising a hole 74 and corrugations 76. A 25 pressure-equalising-strip 78 is attached to the corrugations 76 and a compound 78 creates an airtight closure. The pressure in the can is equalised by removing the strip 78 by pulling the slip 80. Hereafter air may pass into the can 70 through the hole 74.

Fig. 14 shows a can 90 with a lid 92 comprising a hole 94 and a corrugation 96. The hole 30 is covered by a cap 98 and a compound 100 between the cap 98 and the corrugation 96 and the lid 92 provides an airtight seal. When the cap is removed air may pass through the hole 94 such that air is equalised. The compound of this figure and any of the other figures may be glued or heat sealed or welded to the surface(s) to which it is attached.

Fig. 15 shows a can 110 with a lid 112 comprising a hole 114 and a corrugation 116. A cap 118 is provided over the hole and a compound 120 provided in the corrugation 116 provide an airtight closure of the can. The cap may be pushed into the can such that air may pass through the hole. The compound may be weakened in one area such a hole is only 5 or mainly created in the weakened area. The result is that the rest of the compound and the cap may remain attached to the lid after air has been equalised.

Fig. 16 shows a can 130 with a lid 132 with a corrugation 134. A hole 136 may be provided in the corrugation and a compound 138 (covering the hole and encircling the 10 corrugation 134) may provide an airtight closure of the can. A slip in the compound 140 may be pulled such that the compound no longer provides an airtight closure of the hole 136.

Fig. 17 shows a can 150 with a lid 152 comprising a corrugation 154 and a weakened 15 area 156. Initially there is no hole in the lid. A compound 158 provided in the corrugation 154 may support a plate 160 comprising a pin 162 with a cutting edge. When pressure is applied to the plate 160 the pin 162 penetrates the lid 152 in the weakened area 156 such that air may be equalised.

CLAIMS

1. A closure system for closing an opening encircled by a contact surface, the contact surface comprising a first locking means, said system comprising:

5

- a lid terminating in a skirt adapted to extend along an outer surface of said contact surface, the skirt comprising a second locking means adapted to co-operate with the first locking means, so as to secure the lid to the opening, and
- a detachable strip extending circumferentially along the contact surface and

10 overlapping at least a part of the skirt and the contact surface so as to secure the skirt in a locking position in relation to said contact surface.

2. A closure system according to claim 1, wherein the first locking means comprises a curled edge portion.

15

3. A closure system according to claim 1 or 2, wherein second locking means comprises at least one protrusion.

4. A closure stem according to any of claims 1-3, wherein the protrusion comprises a
20 corrugation.

5. A closure system according to any of claims 1-4, wherein the curled edge portion is adapted to co-operate with the at least one corrugation of the contact surface.

25 6. A closure system according to any of the preceding claims, wherein the contact surface comprises a sidewall of a can.

7. A closure system according to any of the preceding claims, wherein the sidewall comprises a tubular member.

30

8. A closure system according to any of the preceding claims, wherein the height of the sidewall is between 1 cm and 50 cm.

9. A closure system according to any of the preceding claims, wherein the cross-sectional
35 shape of the sidewall is substantially circular.

10. A closure system according to any of the preceding claims, wherein the means for engaging comprises at least one projection provided by a curled edge of the skirt.
- 5 11. A closure system according to any of the preceding claims, wherein the at least one corrugation extend circumferentially along the sidewall in an upper part of said sidewall near the opening.
- 10 12. A closure system according to any of the preceding claims, wherein the means for engaging comprises a plurality of projections, and wherein the sidewall comprises a plurality of outwardly extending corrugations engageable with said projections, the projections and corrugations together define a screw thread attachment between the lid and the sidewall.
- 15 13. A closure system according to any of the preceding claims, wherein the lid on at least a part of an internal surface comprises a compound engageable with an upper round-going edge of the sidewall for providing a substantially tight closure between the lid and the sidewall, when the means for engaging engages said at least one corrugation.
- 20 14. A closure system according to any of the preceding claims, further comprising protecting means adapted to protect at least a part of the strip.
15. A closure system according to claim 14, wherein the protecting means comprises at least one protrusion on the lid.
- 25 16. A closure system according to claim 14 or 15, wherein the protecting means comprises at least one protrusion on the can.
- 30 17. A closure system according to any of the preceding claims, wherein a compound is provided inside the at least one corrugation for providing a substantially tight closure between the means for engaging and the at least one corrugation.
18. A closure system according to any of the preceding claims, wherein the strip is taped or heat sealed or welded to the skirt and sidewall.

19. A closure system according to any of the preceding claims, wherein a bottom part comprises a separate attachable part to be seamed to the sidewall.

20. A closure system according to any of the preceding claims, further comprising means
5 for releasing a vacuum from a container comprising the closure system.

21. A closure system according to claim 20, further comprising one or more holes provided in the sidewall and/or lid, the means for releasing vacuum comprising detachable sealing(s) covering said holes.

10

22. A closure system according to claim 21, wherein the sealing(s) are detachable together with said strip.

23. A closure system according to claim 21 or 22, wherein the sealing(s) comprise tap(s)
15 positioned in the one or more holes.

24. A closure system according to any of the preceding claims, wherein the sidewall further comprises one or more strengthening corrugations extending circumferentially and/or towards the opening.

20

25. A closure system according to any of claims 5-24, wherein the diameter of the opening is between 90% and 100% of at least a part of the diameter of the sidewall.

25

26. A method of packing goods, the method comprising the steps of:
– providing a can comprising:
– a tubular member with a sidewall, and first and second openings arranged oppositely, said sidewall comprising at least one corrugation,
– a lid and a bottom part for closing said first and second opening,
respectively, the lid terminating in a skirt adapted to extend along an outer surface of said sidewall, the skirt comprising means for engaging said at least one corrugation, and
– a detachable strip extending circumferentially around the tubular member and overlapping at least a part of the skirt and the sidewall,

35

- attaching the lid to the tubular member by positioning it over the first opening and sliding the skirt along the outer surface of the sidewall until the means for engaging engages the at least one corrugation, and

5 – attaching the strip around the tubular member, so that the strip overlaps at least a part of the skirt and the sidewall,

- filling the tubular member with goods through the second opening, and
- closing the second opening by attaching the bottom part to the tubular member.

10 27. A method according to claim 26, wherein the step of attaching the bottom part comprises seaming the bottom part to the tubular member.

28. A method of packing goods, the method comprising the steps of:

15 – providing a can comprising:

- a container with a bottom, a sidewall, and an opening arranged oppositely to the bottom, said sidewall comprising at least one corrugation,

20 – a lid for closing said opening, the lid terminating in a skirt adapted to extend along an outer surface of said sidewall, the skirt comprising means for engaging said at least one corrugation, and

- a detachable strip extending circumferentially around the container and overlapping at least a part of the skirt and the sidewall,

25 – filling the container with goods through the opening, and

- attaching the lid to the container by positioning it over the opening and sliding the skirt along the outer surface of the sidewall until the means for engaging engages the at least one corrugation, and

30 – attaching the strip around the container, so that the strip overlaps at least a part of the skirt and the sidewall.

1/17

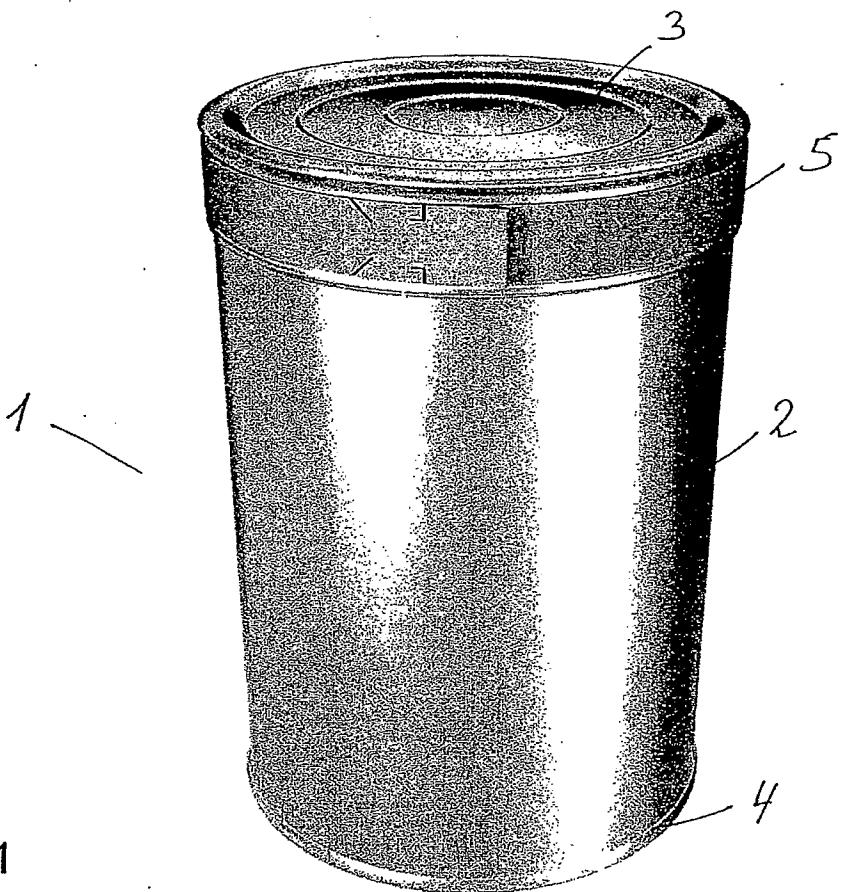
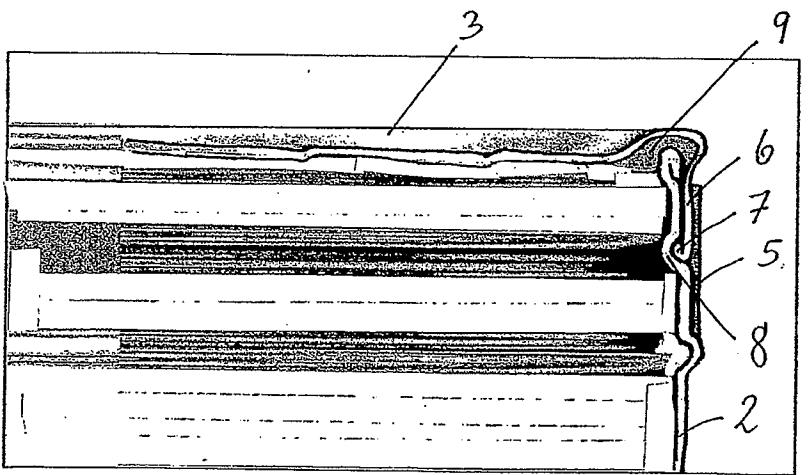


Fig. 1



2/17

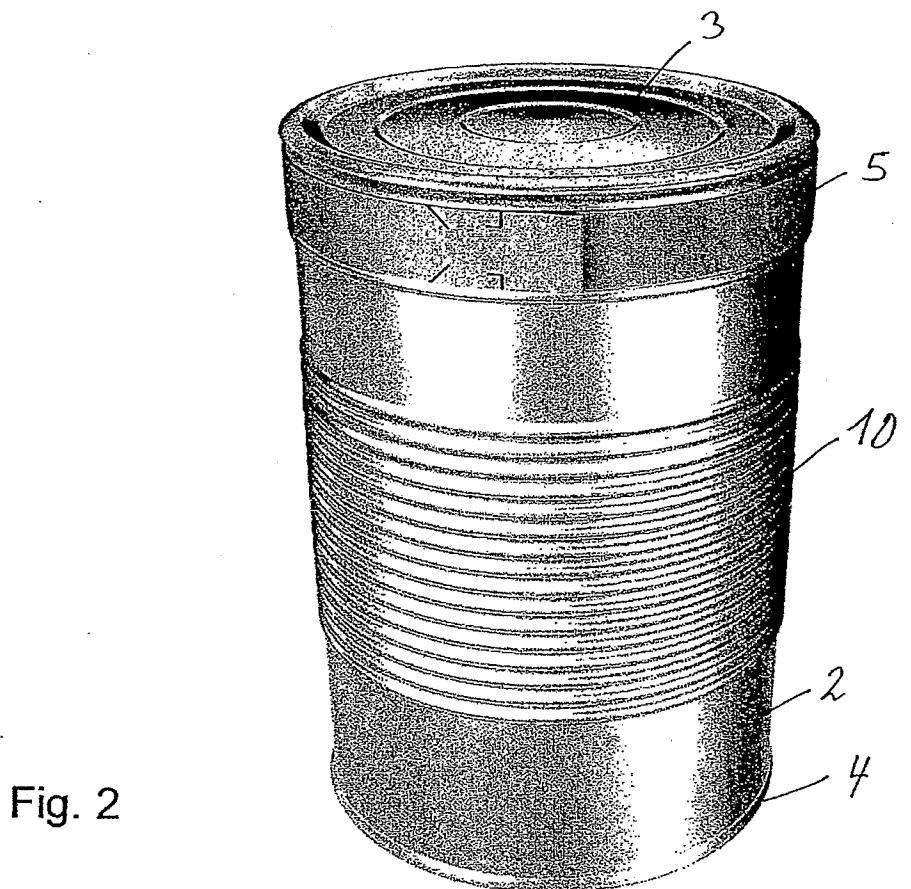
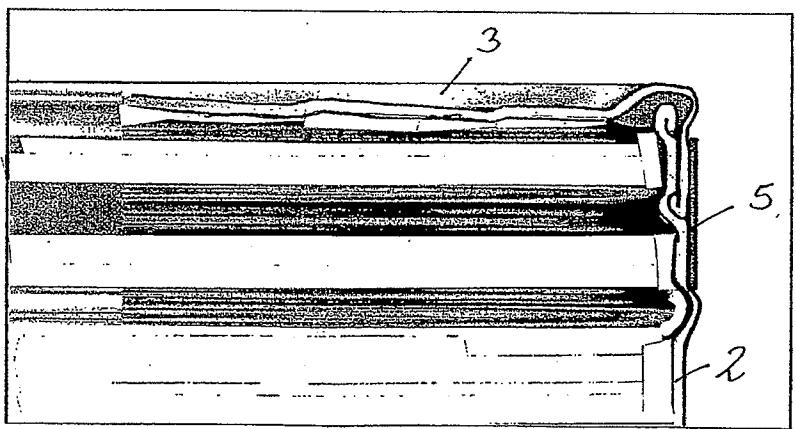


Fig. 2



3/17

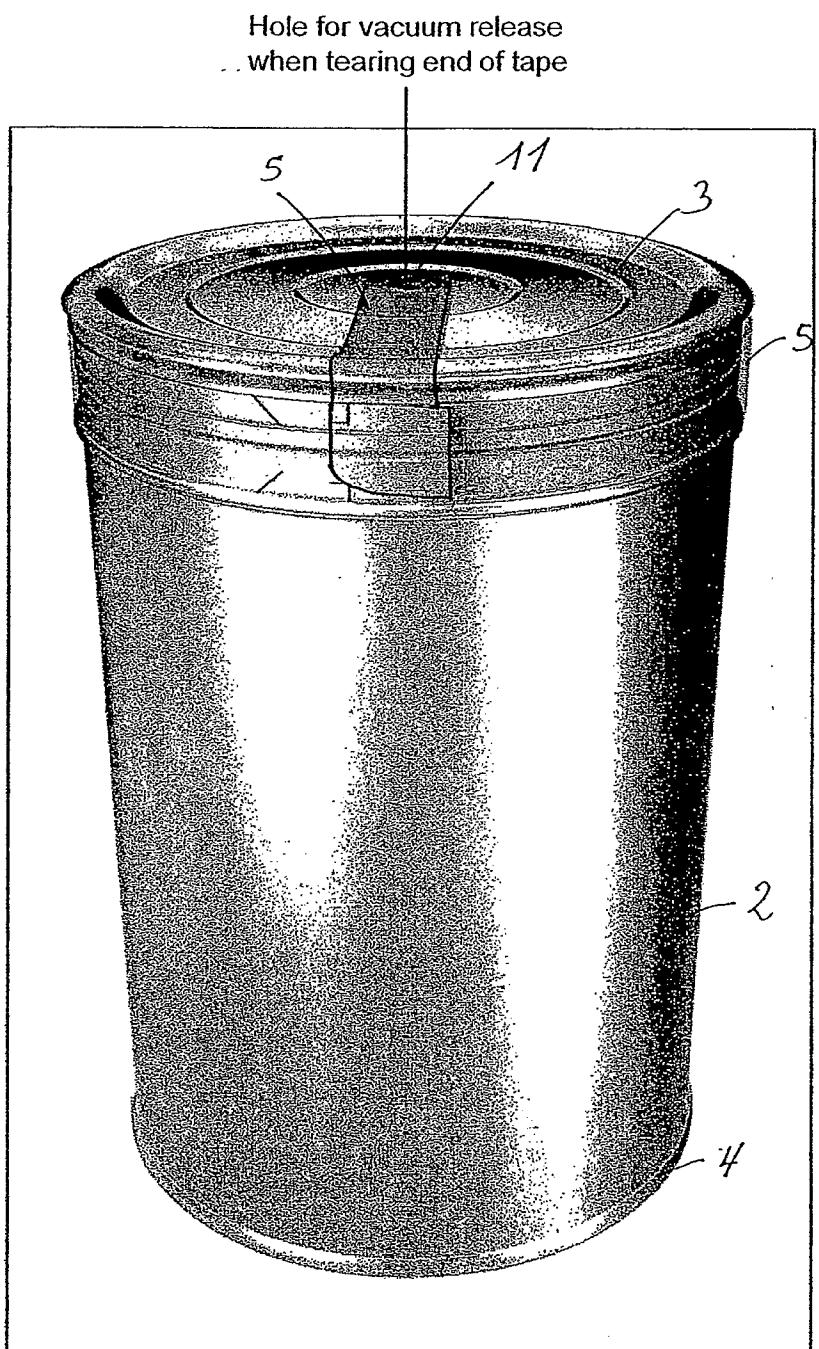


Fig. 3

4/17

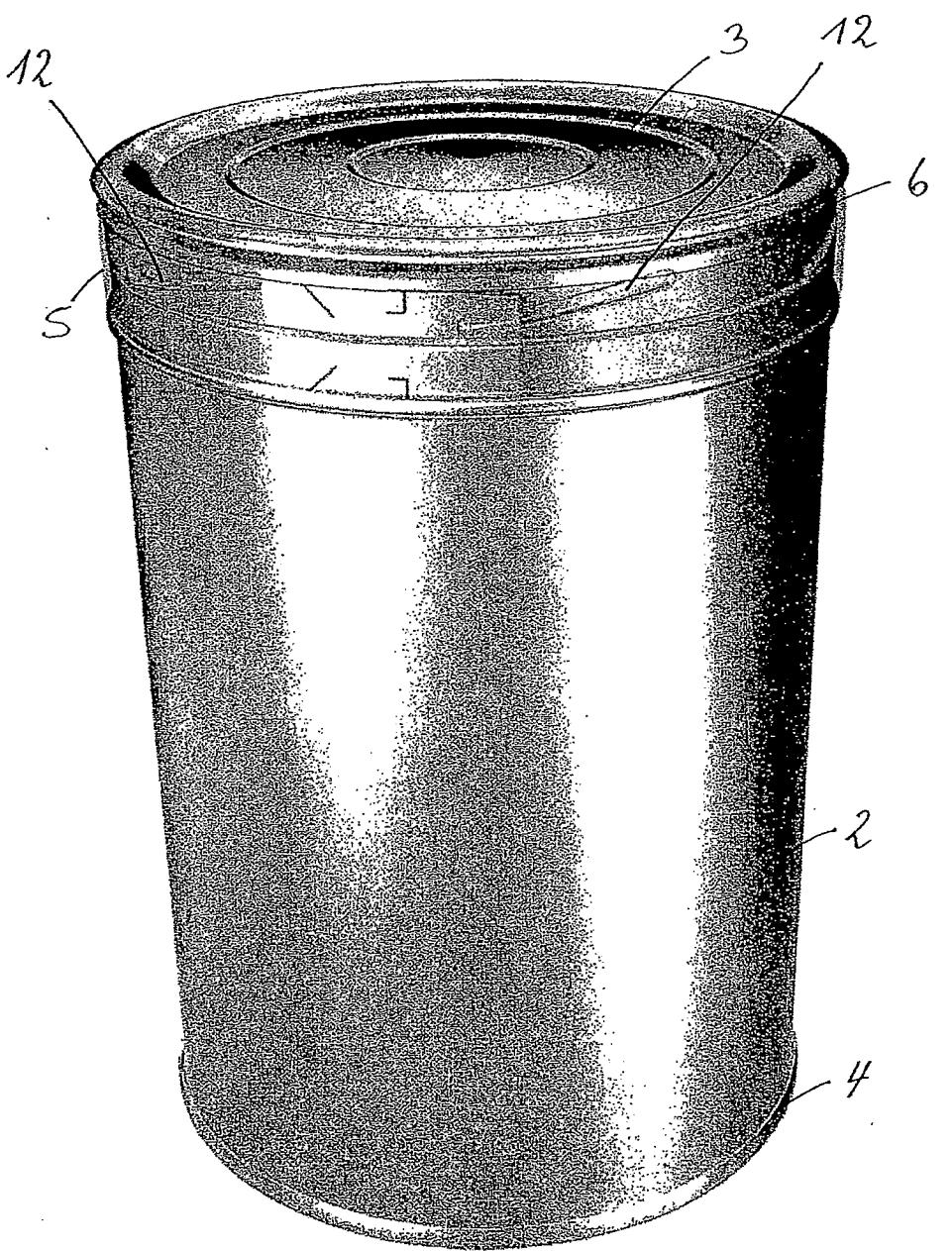


Fig. 4

5/17

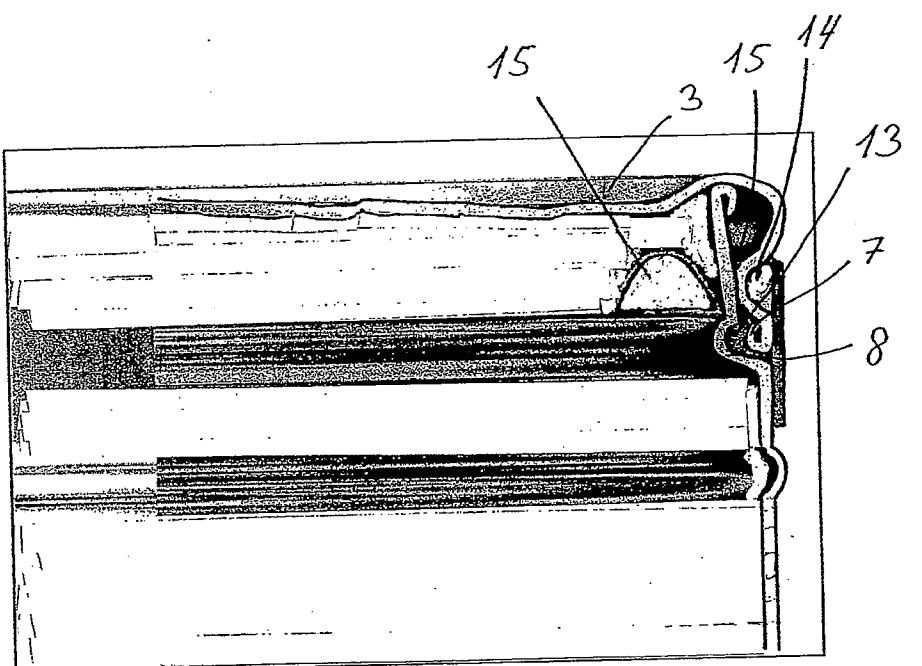
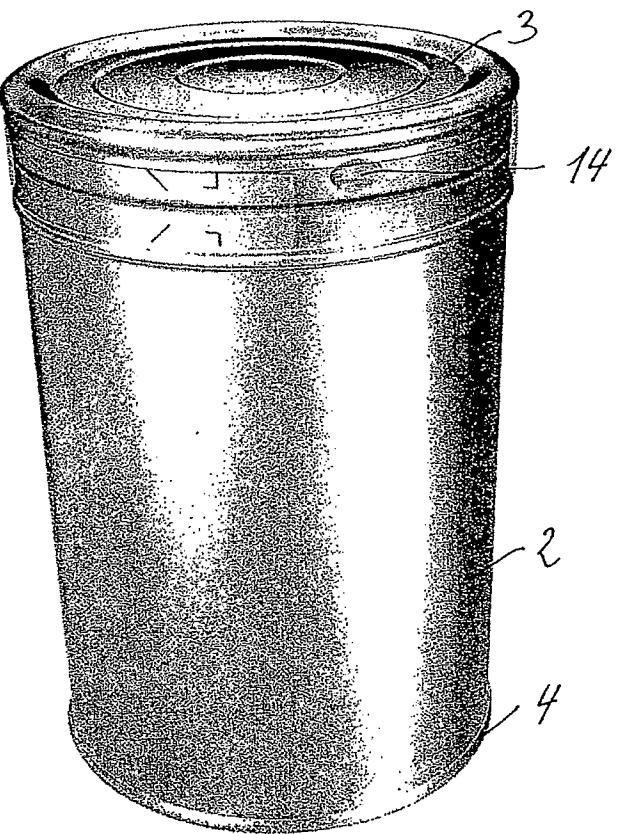


Fig. 5



6/17

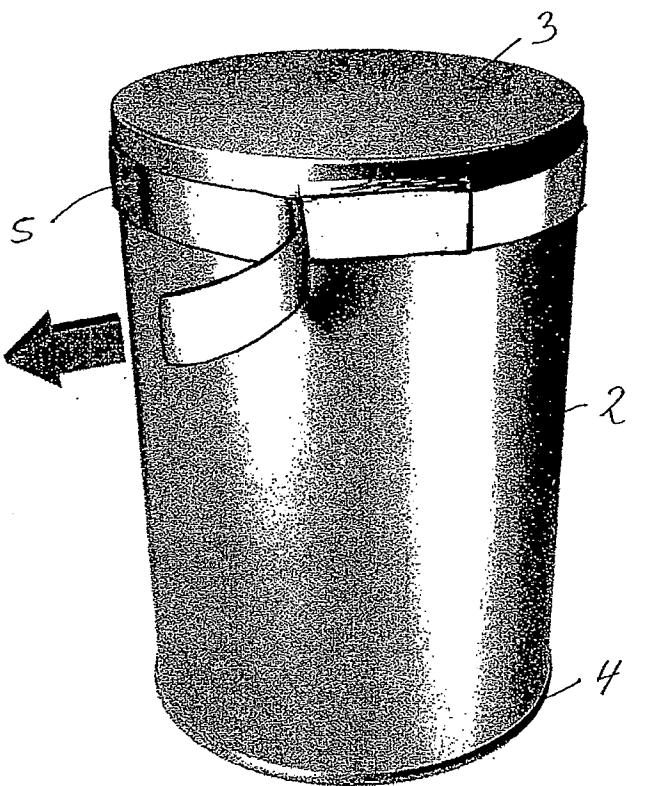


Fig. 6

7/17

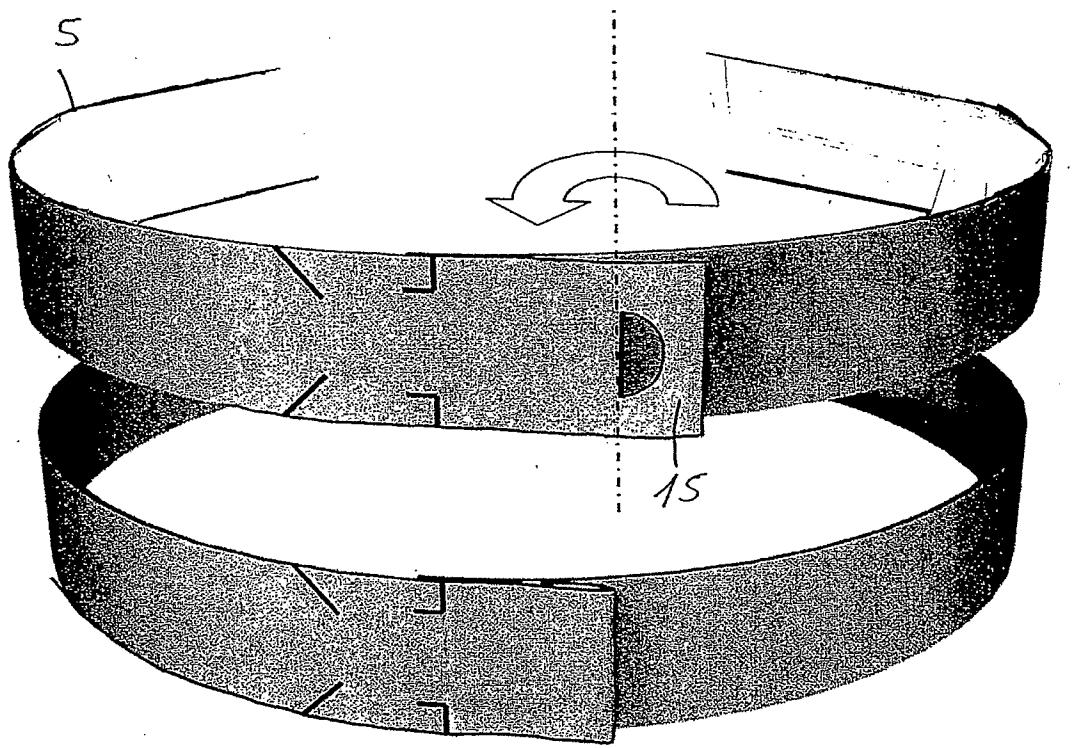
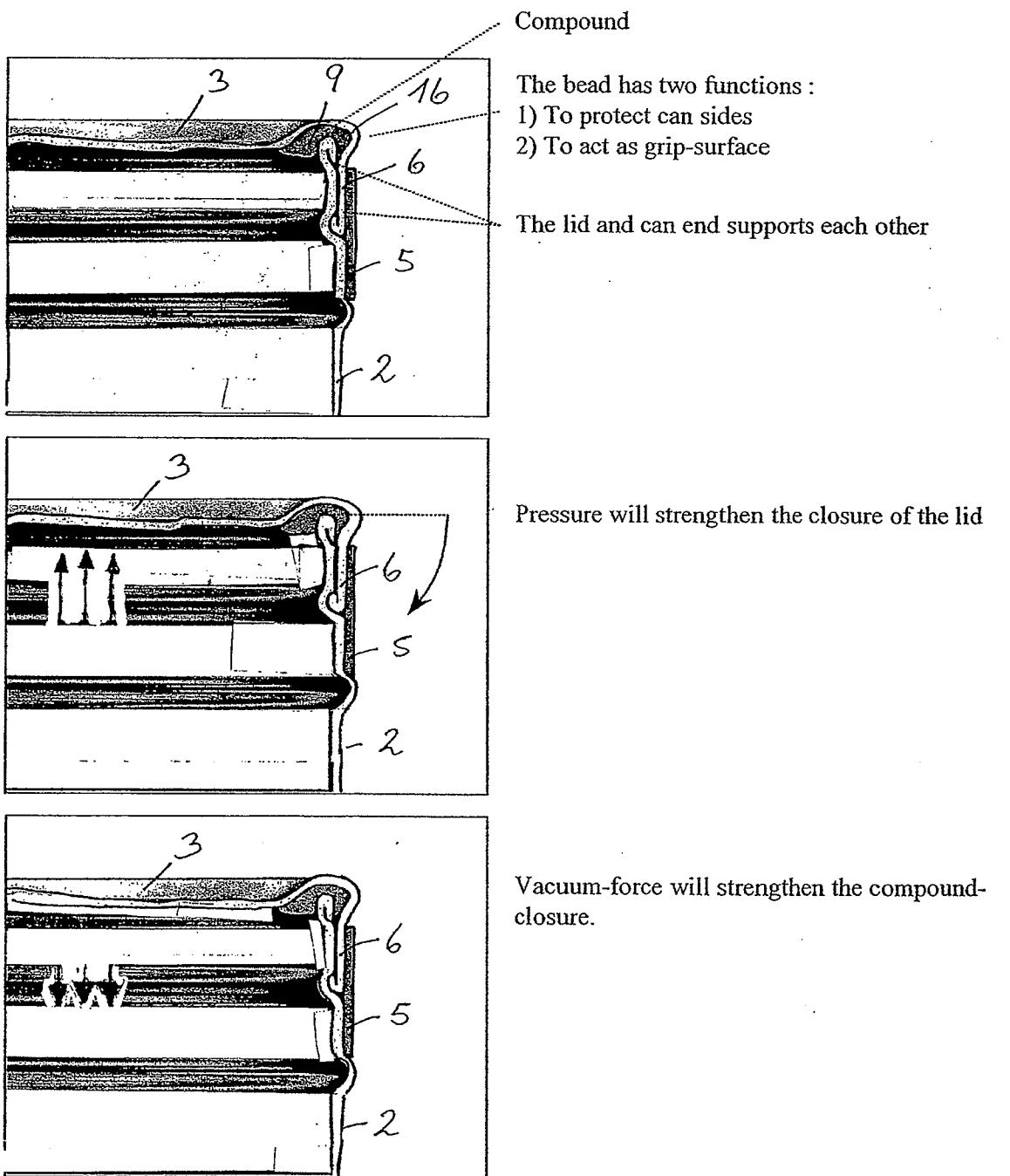


Fig. 7

8/17

Fig. 8



9/17

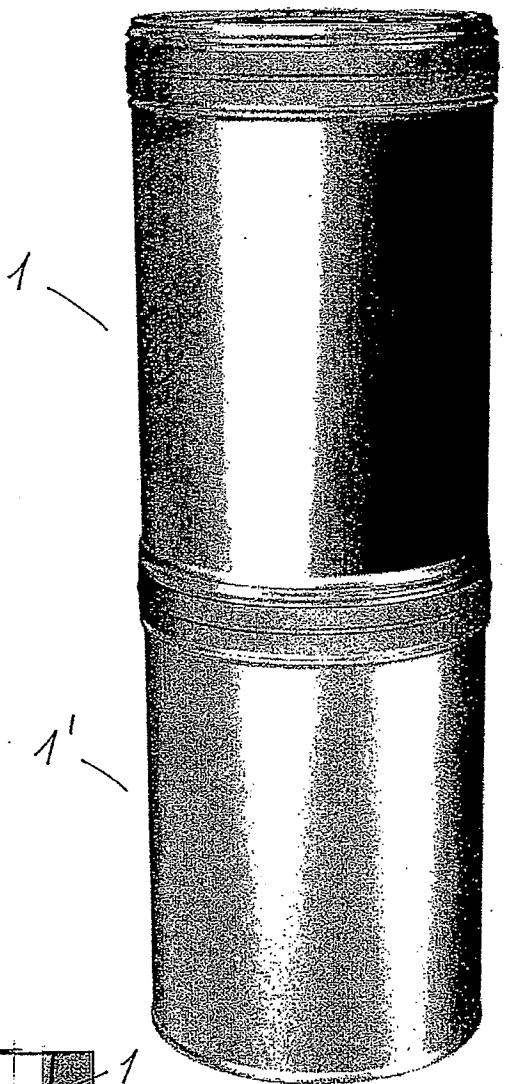
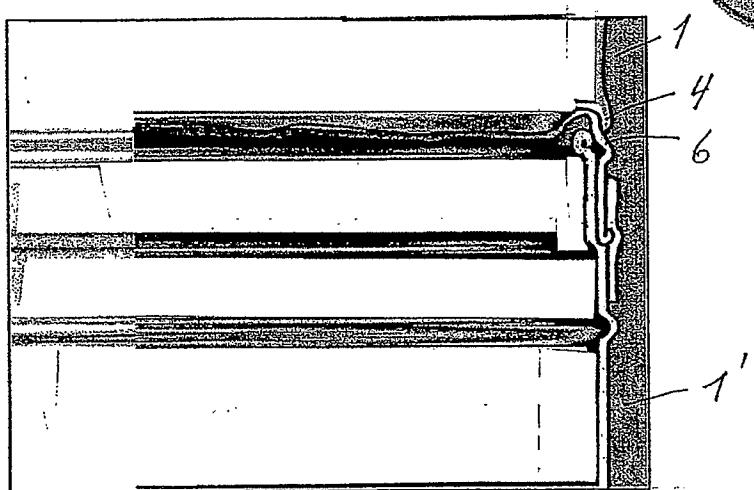


Fig. 9



10/17

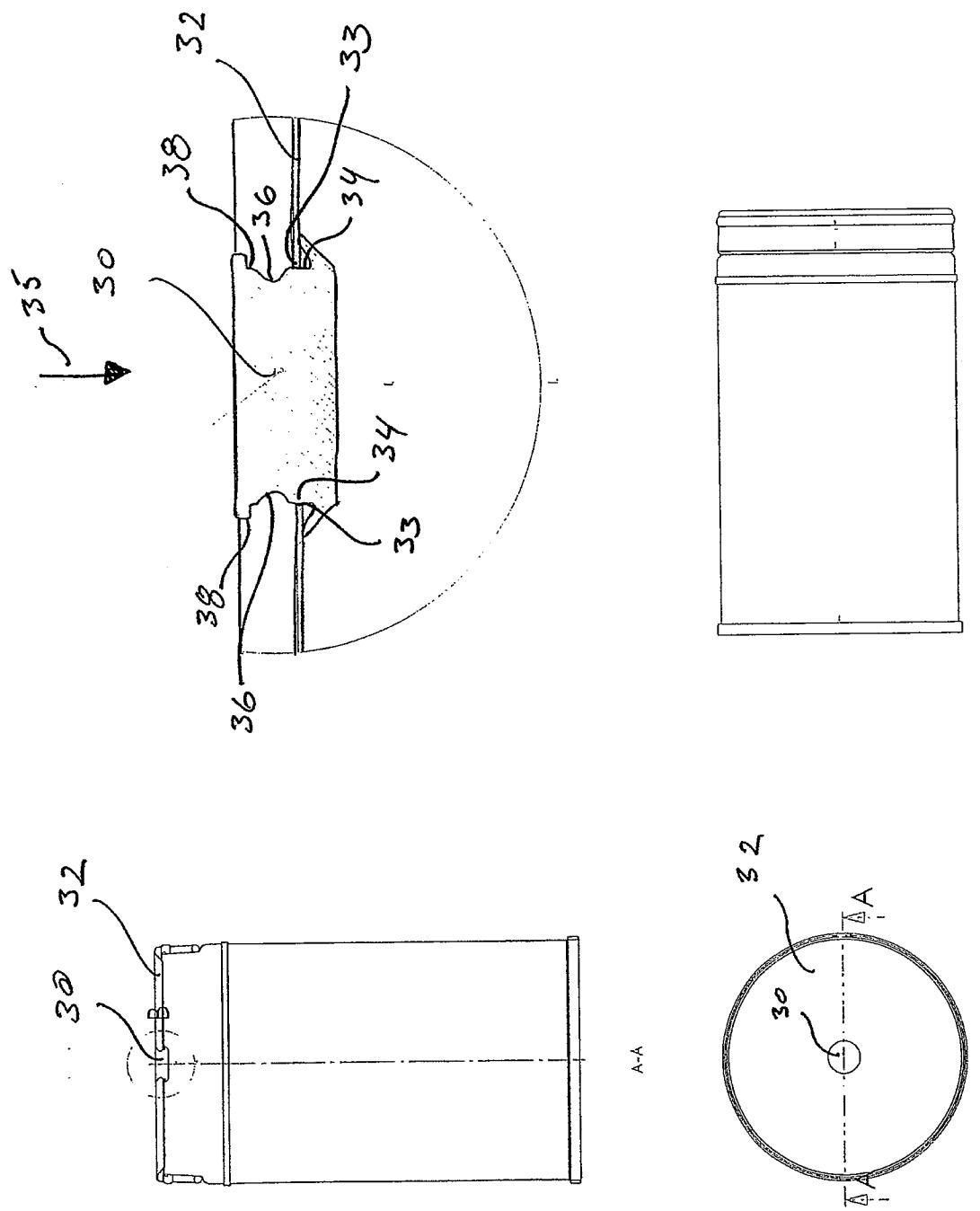


Fig. 10

11/17

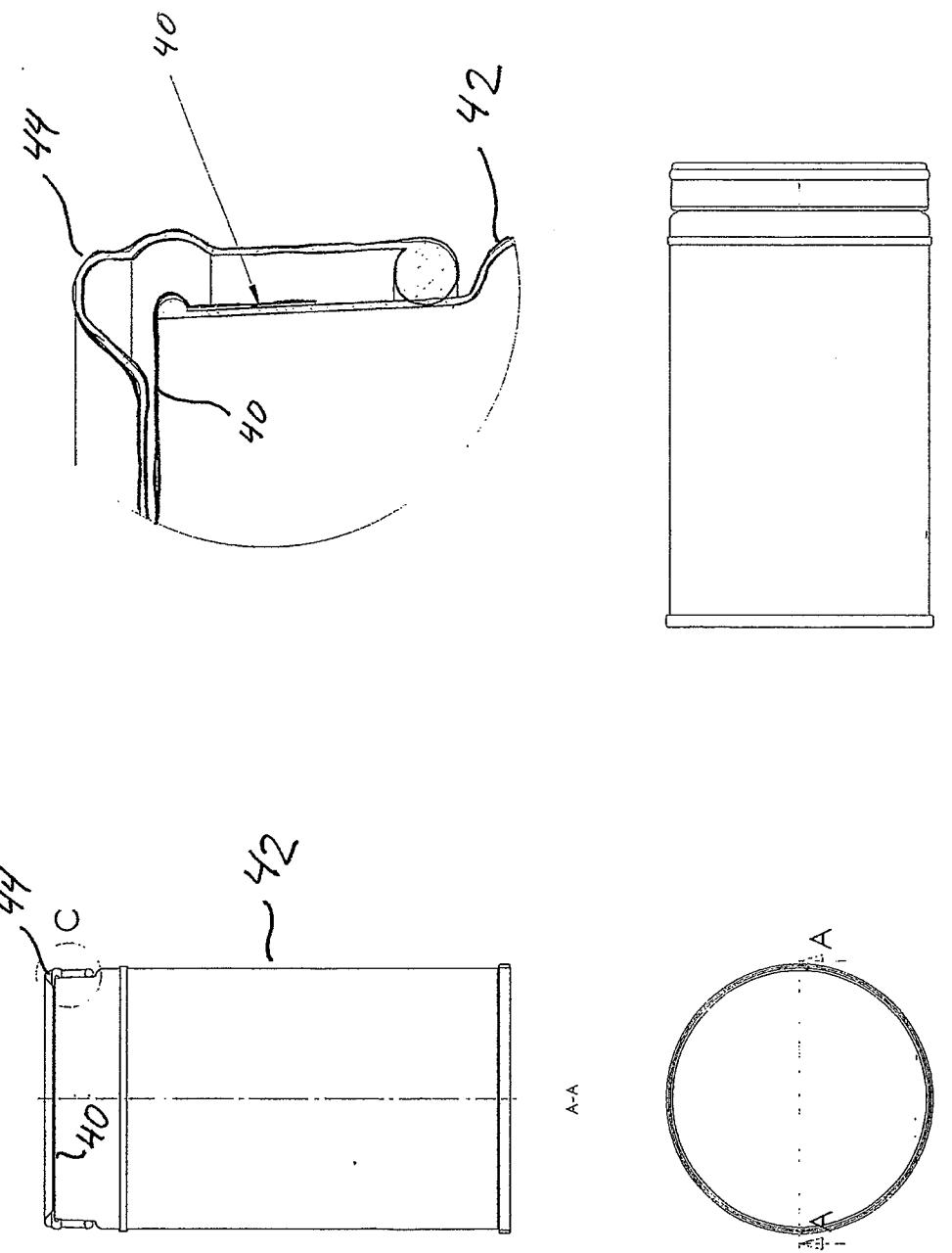


Fig. 11

12/17

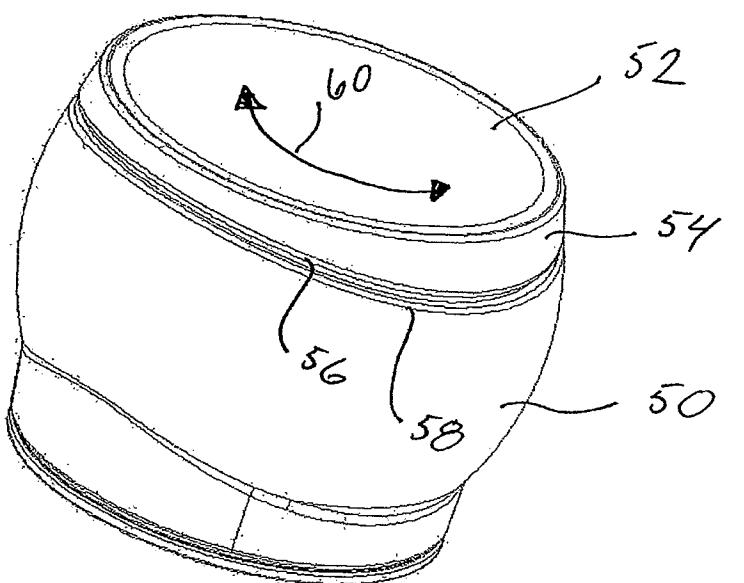


Fig. 12

13/17

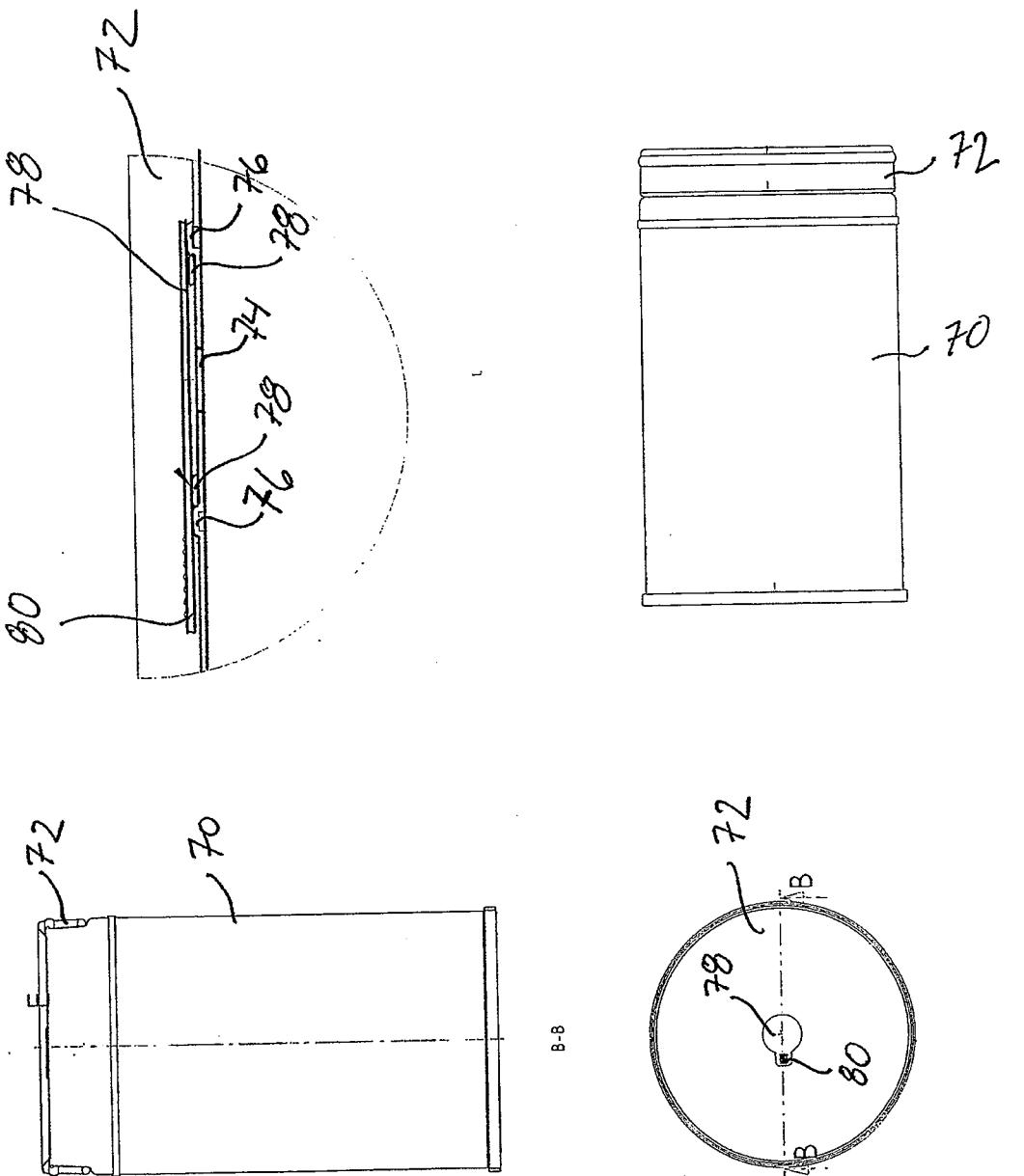


Fig. 13

14/17

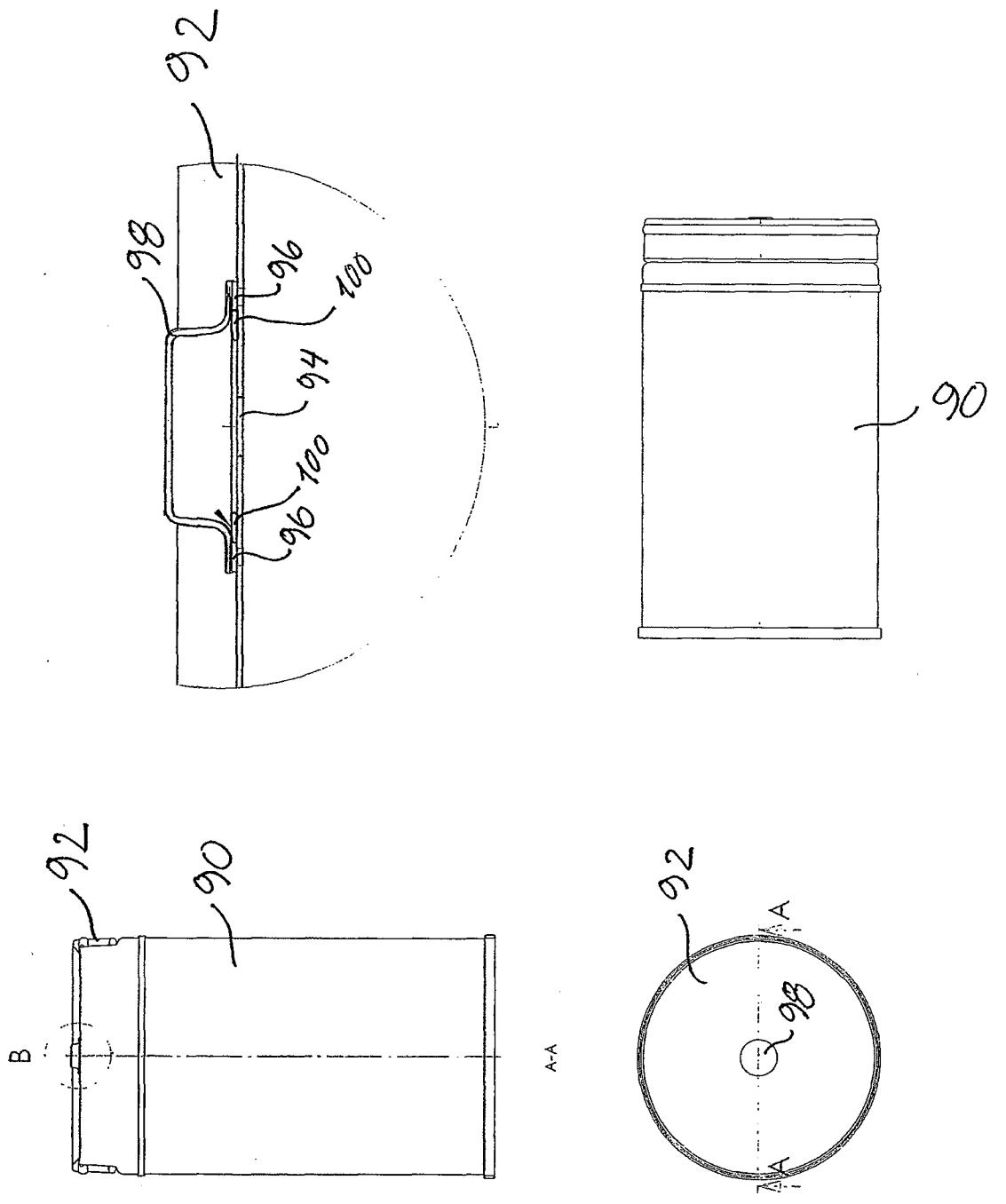


Fig. 14

15/17

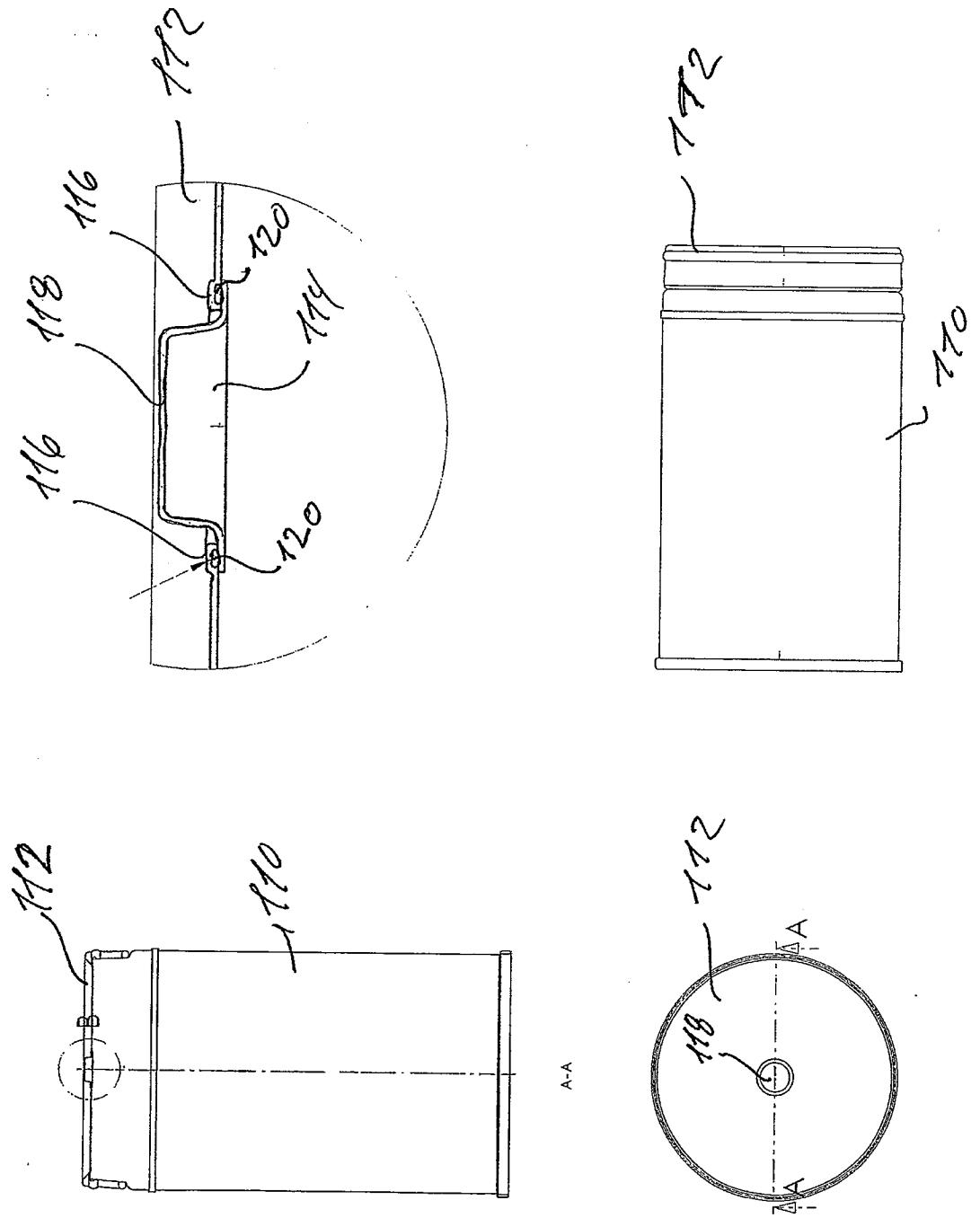


Fig. 15

16/17

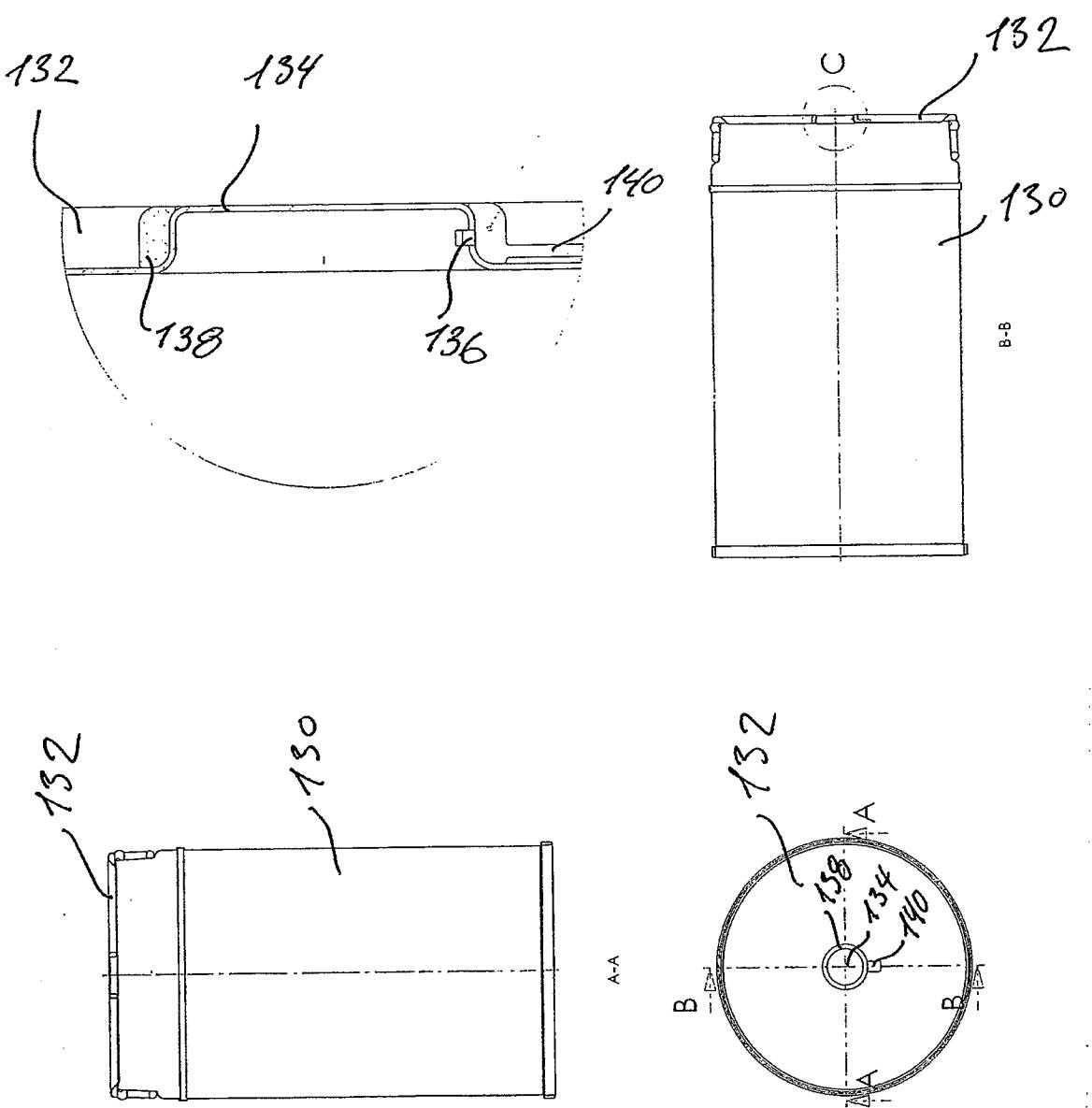


Fig. 16

17/17

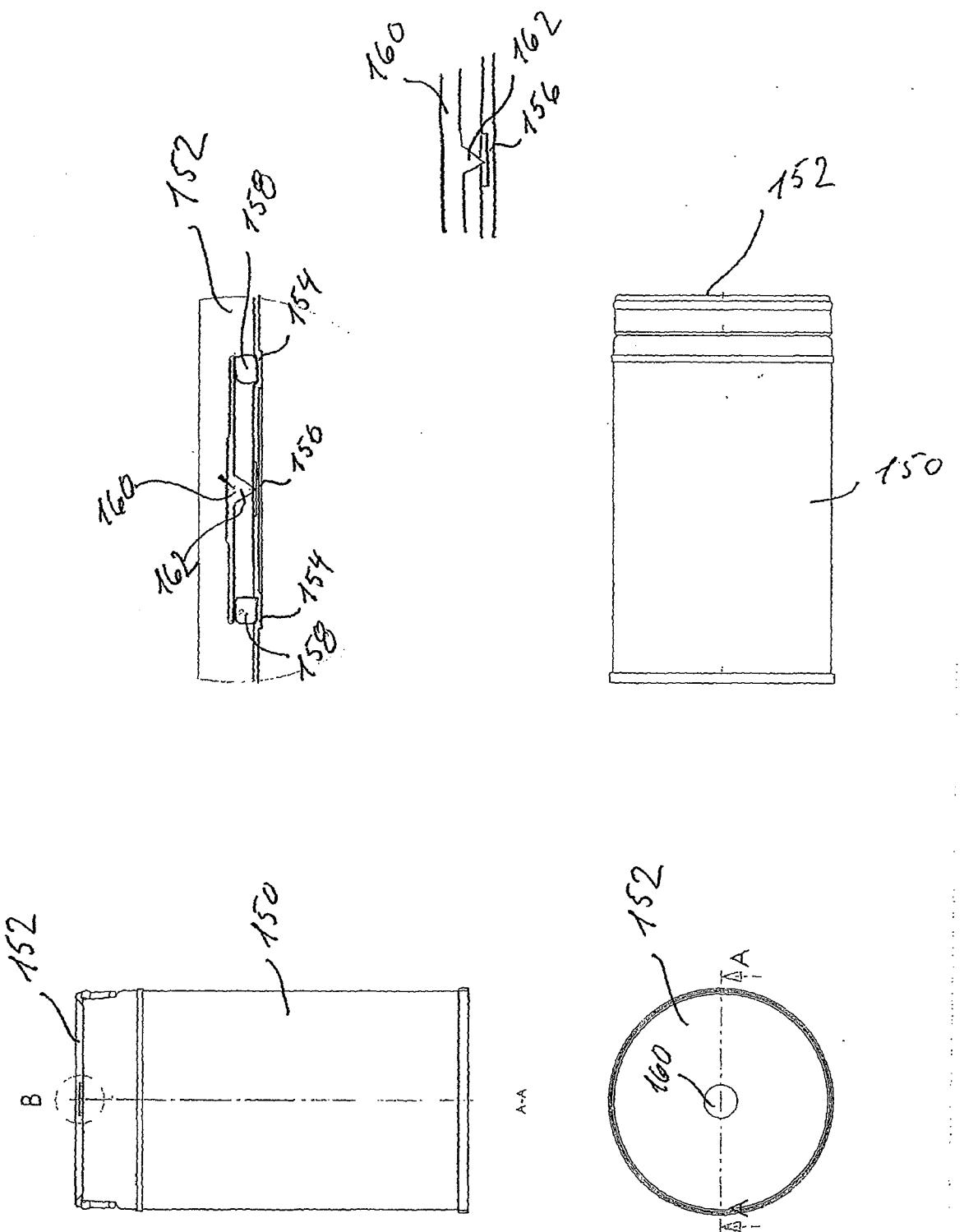


Fig. 17

INTERNATIONAL SEARCH REPORT

International Application No
PCT/DK 02/00569

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D43/10 B65D45/32 B65D55/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 344 945 A (BOZEK JOHN S) 3 October 1967 (1967-10-03) the whole document ---	1-11,18, 26,28
A	CH 359 611 A (HOFFMANN AG GEB) 15 January 1962 (1962-01-15) the whole document ---	1,3,4, 6-9,11, 12,26,28
A	DE 44 21 523 C (EFFEM GMBH) 26 October 1995 (1995-10-26) abstract; figures ---	1-12,26, 28
A	US 3 637 105 A (LEBLOIS MICHEL) 25 January 1972 (1972-01-25) abstract; figures ---	1,26,28 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 November 2002	13/12/2002
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel: (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer SERRANO GALARRAGA, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 02/00569

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 205 045 A (MEYER ERICH;BENJAMIN ANDRIESSE; CHRISTIAN BAUMBACH) 13 December 1923 (1923-12-13) -----	
A	US 3 608 772 A (ASMUS RICHARD W) 28 September 1971 (1971-09-28) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/DK 02/00569

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 3344945	A	03-10-1967	NONE		
CH 359611	A	15-01-1962	NONE		
DE 4421523	C	26-10-1995	DE	4421523 C1	26-10-1995
US 3637105	A	25-01-1972	BE CA DE ES FR GB JP OA	741738 A 931113 A1 1958799 A1 179765 Y 1596731 A 1268525 A 51008073 B 3176 A	16-04-1970 31-07-1973 09-07-1970 16-12-1973 22-06-1970 29-03-1972 13-03-1976 15-12-1970
GB 205045	A	13-12-1923	NONE		
US 3608772	A	28-09-1971	US	3748816 A	31-07-1973